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EXAMINER

AKHAVANNIK, HUSSEIN

ART UNIT PAPER NUMBER

2621

DATE MAILED: 06/20/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/441,294

Applicant(s)

HIGGINBOTTOM ET AL.

Examiner

Hussein Akhavannik

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 44-70 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 44 and 45 is/are allowed.
- 6) ☒ Claim(s) 1-13 and 46-70 is/are rejected.
- 7) ☒ Claim(s) 8 and 57 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 31 March 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Response to Amendment

1. The Applicant's amendment to cancel claim 14-43 overcomes the examiner's restriction requirement cited in paragraph 1 of the previous office action.
2. The Applicant's amendments to page 17 and 23 the specification on overcome the examiner's objection cited in paragraph 2 of the previous office action.
3. The Applicant's amendments to figures 3, 4, 11, 16a, 23a, and 23b overcome the examiner's objection cited in paragraph 3 of the previous office action.

Response to Arguments

4. Applicant's arguments filed March 31, 2003 have been fully considered but they are not persuasive.

The examiner agrees with the Applicant that the "merit value" disclosed by Donnelly et al is used to determine how useful a template will be and is not a confidence level between a determined set of spatial features and known set of spatial features. However, the Applicant alleges that Donnelly et al do not disclose or suggest the feature of comparing a determined set of spatial features to a known set of spatial features to provide a confidence measure of the correlation error between the sets of features. Examiner respectfully disagrees. Donnelly et al explains in column 18, line 51 to column 19, line 10 and in table 4 (column 17, lines 45-53) that the position information of the detected templates is used in order to determine whether the a predetermined mark has been detected. The template locations, A and B, are used to determine whether the detected spatial relationship between the marks corresponds to the known spatial relationship between the marks (as illustrated in figure 10). Thus, if the difference between A

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and B in the x-axis is less than or equal to ϵ_x and the difference between A and B in the y-axis is less than or equal to ϵ_y , then a match is determined to have occurred. Therefore, $|A-B|$ in the x-axis and y-axis correspond to the claimed correlation error between the spatial features of the known and determined set of features. ϵ_x and ϵ_y are thresholds corresponding the claimed detecting of a predetermined on the basis of the confidence level measure.

Specification

5. Claim 57 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 57 recites the same limitations as its parent claim 56, and therefore does not further limit the claim.

6. In claim 8, "Apparatus according; to claim 6" should be changed to "Apparatus according to claim 6".

Appropriate correction is required.

Drawings

7. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 3/31/2003 has been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

Allowable Subject Matter

8. Claims 44 and 45 are allowed.

9. The following is a statement of reasons for the indication of allowable subject matter:

The closest cited prior art (U.S. Patent No. 6,002,800) fails to teach or suggest the features of a signature comprising a plurality of radial signatures wherein each of the radial signatures indicates a discrete angular distribution of a plurality of elements about a predetermined origin in view of the further limitations of independent claims 44 and 45.

10. Claims 7, 12, 46-56 and 58-60 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

12. Claims 1, 4, 9, and 61-70 are rejected under 35 U.S.C. 102(e) as being anticipated by Donnelly et al (U.S. Patent No. 6,002,800).

Referring to claims 1, 4, and 9,

- a. Processing the image to provide an encoded representation of the image at a predetermined resolution is explained by Donnelly et al in column 7, lines 40-43 and illustrated in figure 1 as the scanner (2).
- b. Detecting coordinate positions for each of the elements of the mark embedded in the image by applying at least one mask is explained by Donnelly et al in column 7, lines 8-15 and illustrated in figure 10. In figure 10, two templates are detected and each of their center points is determined in order to calculate the positional vector (58). The template, which corresponds to the mask explained by the applicant, is compared with the cells of the input image, which correspond to pixels.
- c. Determining a set of spatial features representing a spatial arrangement of the detected elements is explained by Donnelly et al in column 6, line 64 to column 7, line 7 and illustrated in figure 10. The spatial feature of the detected templates is the positional vector, which comprises of a length and direction.
- d. Comparing the determined set of spatial features to a known set of spatial features to provide a confidence level measure representing a correlation error between the spatial features of the known and determined set is explained by Donnelly et al in column 18, line 51 to column 19, line 10 and in table 4 (column 17, lines 45-53). Donnelly et al use the position information of the detected templates in order to determine whether a predetermined mark has been detected. The template locations, A and B, are used to determine whether the detected spatial relationship between the marks corresponds to the known spatial relationship between the marks (as illustrated in figure 10). Therefore, |A-

B| in the x-axis and y-axis correspond to the claimed correlation error between the spatial features of the known and determined set of features.

e. Detecting the predetermined mark on the basis of the confidence level measure is explained by Donnelly et al in column 19, lines 1-10. Donnelly et al explain that if the difference between A and B in the x-axis is less than or equal to ϵ_x and the difference between A and B in the y-axis is less than or equal to ϵ_y , then a match is determined to have occurred. Therefore, ϵ_x and ϵ_y correspond to thresholds that determine whether a predetermined mark has been detected.

Referring to claim 61, 64, and 68,

a. An input means for receiving a plurality of one-dimensional arrays of pixel values of the image is illustrated by Donnelly et al in figure 27 by the input of the phase data pd_d (162). Donnelly et al illustrate the phase data of the input image by one-dimensional rows of pixels in figure 23.

b. A foreground adder means for generating a plurality of partial sums of the foreground pixels, wherein each partial sum of the foreground pixels corresponds to an application of a slice of the mask is illustrated by Donnelly et al in figure 28 by the partial sums 238, 259, 253, 266, 258, and 252. Donnelly et al explain that each of these partial sums are latched so that they can be tallied in column 13, lines 16-28.

c. A background adder means for generating a plurality of partial sums of the background pixels, wherein each partial sum of the background pixels corresponds to an application of a slice of the mask is illustrated by Donnelly et al in figure 28 by the partial sums 238, 259, 253, 266, 258, and 252. The comparator array (165) inherently includes

foreground and background pixels and therefore, by comparing and summing the matching pixels between a comparator array and an input image, the number of matching background pixels will inherently be accumulated.

d. A foreground accumulator network providing a total foreground count of the plurality of partial sums for a predetermined number of input array pixels is explained by Donnelly et al in column 12, lines 33-51 and illustrated in figure 27 by the tally arrays, which accumulate the total number of matching pixels of each column of the input image data.

e. A background accumulator network providing a total background count of the plurality of partial sums for a predetermined number of input array pixels is illustrated by Donnelly et al in figure 27 by the tally arrays 186-189. These tally arrays may be used to accumulate the number of background pixels matching between an input image and a comparator array.

f. A thresholding means for thresholding the total foreground count and the total background count against first and second predetermined thresholds and outputting a value reflecting each threshold comparison is illustrated by Donnelly et al in figure 33 and explained in column 13, lines 40-50. Each of the "X" values corresponds to areas where the accumulation of matching pixels resulted in positive results (explained in column 13, lines 16-28). In order to determine "X", it is inherent that a threshold must have been used to indicate whether a tally produced positive or negative results. Therefore, the "X" values correspond to foreground regions and the zero values correspond to background regions.

g. A determining means for determining from each output value whether or not the predetermined value is detected is explained by Donnelly et al in column 13, lines 40-45. Donnelly et al explain that a match is determined to occur when a diagonal of template matches is determined to occur. The template matches correspond to positive accumulation results from the accumulating means of Donnelly et al.

Referring to claim 67,

- a. Providing a plurality of one-dimensional arrays of pixel values of an image corresponds to claim 61a.
- b. Generating a plurality of partial sums of on pixel values for a current one dimensional array of pixel values which match with an on cell of the reference pattern of a slice mask corresponds to claim 61b, where on cells correspond to foreground pixels.
- c. Thresholding the accumulated partial sums against a predetermined threshold value and determining whether or not the predetermined pattern is detected corresponds to claim 61f-g.

Referring to claims 62 and 69, each scan line having a plurality of pixel values and the one dimensional array comprising of a predetermined number of pixel values of corresponding locations of a plurality of adjacent scan lines is illustrated by Donnelly et al in figure 28. Each scan lines (265, 246, or 228) comprise of a predetermined number of pixels and are adjacent to each other.

Referring to claim 63, the apparatus forming a pipeline circuit for pipelining the sequences of one-dimensional arrays is illustrated by Donnelly et al in figure 28 by the individual

accumulation of matches in each column represented by reference numbers 238, 259, 253, 266, 258, and 252.

Referring to claims 65 and 70, the foreground pixels being pixels having one color selected from a first set of color values and the background pixels being pixels having one color selected from a predetermined set of color values is illustrated by Donnelly et al in figure 7A-7D. The black pixels correspond to foreground pixels and the white pixels correspond to background pixels.

Referring to claim 66, each cell of the slice of the mask corresponding to a pixel value of the one-dimensional array is explained by Donnelly et al in column 12, lines 33-51 as the comparator array is explained to be the template data stored. Therefore, each cell of the template corresponds a cell of the one-dimensional array used to compare the input image with the templates.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 2-3, 5-6, 8, 10-11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Donnelly et al in view of Inaoka et al (U.S. Patent No. 6,351,550).

Referring to claims 2, 5, and 10, the spatial features indicating the angular distribution about a predetermined origin for each mark is not explicitly explained by Donnelly et al. However, Inaoka et al do explain an angular distribution of detected elements about an origin in

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column 20, lines 9-22 and illustrates such a distribution in figure 22d. The angles α and β are determined from a predetermined origin and are used to determine whether the extracted feature points of a target bill correspond to those of a reference bill. To determine the authenticity of a document using several detection elements, it is well known in the art to determine a relationship between the elements to reduce the probability of a false detection. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the angular distribution of multiple detected elements to determine the authenticity of a document.

Referring to claims 3, 6, and 11, the angular distribution comprising of a signature indicating a discrete angular distribution is not explained by Donnelly et al, but is illustrated by Inaoka et al in figure 22d. The angles α and β are discrete angles as the angles determined by the CPU (15) are not exact. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use discrete angles, as any angle that is calculated is not exact and would therefore be discrete.

Referring to claims 8 and 13, comparing the signature of the determined spatial feature with a corresponding signature of a known mark is not explained by Donnelly et al, but is explained by Inaoka et al. Inaoka et al explain that the angles and distances between the four feature points extracted from the reference bill are calculated by the CPU (15) in column 20, lines 9-22. Then, Inaoka et al explain that the same information is computed from the target bill in column 20, lines 23-30. Finally, the positional data of the target bill is compared with the known position data of the reference bill to determine whether the reference points correspond to each other, as explained by Inaoka in column 20, lines 31-39. Comparison of two signatures, or spatial data, is common in the art to determine whether two documents correspond to each other.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to compare the signature of a document, which is input to a signature of a known mark to determine whether the input document contains the known mark.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lin (U.S. Patent No. 6,272,245) – To exhibit recognizing a document by comparing the characteristics of the detected document to a model stored in memory as illustrated in figures 8 and 9.

Itakawa (U.S. Patent No. 6,404,901) – To exhibit identifying foreground, background, and transition pixels in order to recognize objects as illustrated in figure 29.

Ohmae et al (U.S. Patent No. 6,188,787) – To exhibit comparators in separate colors as illustrated in figures 3 and 5.

16. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hussein Akhavannik whose telephone number is (703)306-4049. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H. Boudreau can be reached on (703)305-4706. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9314 for regular communications and (703)872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-3900.

Hussein Akhavannik
June 16, 2003

H.A.

A handwritten signature in black ink, appearing to read "Leo Boudreau". The signature is stylized with large, sweeping loops.

LEO BOUDREAU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600